UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/573,810	03/28/2006	Nobuo Miyadera	396.46073X00	9359

20457 7590 11/24/2008

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER	
BEDTELYON, JOHN M	
ART UNIT	**PAPER NUMBER**
2874	

MAIL DATE	DELIVERY MODE
11/24/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/573,810	MIYADERA ET AL.	
	Examiner	Art Unit	
	JOHN M. BEDTELYON	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21,24,25 and 28-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21,24,25 and 28-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 March 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/25/2008 has been entered.

Response to Amendment

2. This action is responsive to the amendment and remarks submitted 03/25/2008. Claims 1, 2, 21, and 25 are currently amended. Claims 22, 23, 26, and 27 are canceled. Claims 29-40 are newly added. Claims 1-21, 24, 25, and 28-40 are currently pending in the Application.

Response to Arguments

3. Applicant's arguments with respect to claims 1-21, 24, 25, and 28-40 have been considered but are moot in view of the new ground(s) of rejection, however, still relevant arguments are addressed below.

4. While the grounds of rejection have changed, in view of the amended claims, US Patent 6,236,784, hereinafter Ido, is still used as a secondary reference in the rejection that follows. Applicant argues that Ido has an intensity distribution of light that is

symmetric as its input and its output has an intensity distribution that is asymmetric, while the Applicants device has an asymmetric input and symmetric output and further that Ido doesn't teach a curved input waveguide that would cause said asymmetric light.

5. The Examiner notes that in the rejection that follows, the primary reference, Johannessen et al. (US Patent 6,970,625) teaches the curved input waveguide and therefor it is irrelevant that Ido either does or does not teach a curved input waveguide. Ido is relied upon for its teaching of a notch in the side of a MMI in order to adjust the intensity distribution and therefor it is irrelevant whether Ido is changing a symmetric input to asymmetric outputs or vice-versa, as it's the general teaching of adjusting the intensity distribution that is gained from the disclosure of Ido.

Drawings

6. The drawings were received on 03/25/2008. These drawings are accepted.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 4, 7, 8, 9, 11, 21, 24, 29, 31, 33, 35, 37, and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Johannessen et al. (US Patent 6,970,625, hereinafter Johannessen).

Johannessen teaches:

Claims 1 and 21: A light branching optical waveguide (200) comprising:

At least on incident light waveguide (A, a) (210) optically connected to one end of a multi-mode optical waveguide (214); and

Output light waveguides (B) (206, 208) connected to the other end of the multi mode waveguide (214);

An intensity distribution of light entering from at least one optical waveguide (a, A, only one input, waveguide 212 is disregarded) (210) into the multi-mode optical waveguide at a connected surface of the at least one incident light waveguide (210) and the multi-mode optical waveguide is asymmetric (due to the curve of waveguide (210)) with respect to a geometrical central axis of the at least on optical waveguide (210), the at least one optical waveguide (210) having a curved structure (see figure 5) with light entering from said at least one optical waveguide (a, A, 210) into said multi-mode optical waveguide (214), and with light having a wavelength entering at least two of said output light waveguide (206, 208) from said multi-mode optical waveguide, so as to branch said light from the multi-mode optical waveguide having the same wavelength into each of said at least two of said output light waveguides (*column 7, lines 19-44 teaches the output powers can be made to be the same, which would split light having the same wavelength into each of the outputs, and also that the Y-branch can be formed using the Y-branches 10 and 40, which are described as being made of a material with desired properties*

for a desired communications wavelength 1310 nm and 1550nm, suggesting one of those wavelengths be used through the device, and as the power can be split equally between the outputs, each output would get the same wavelength, either 1310 or 1550nm);

And an extended line of the geometrical central axis of the at least one optical waveguide (210) does not coincide with a geometrical central axis of the multi-mode optical waveguide (figure 5).

Claim 4: the patentability of an apparatus depends only on the claimed structural limitations. Johanessen teaches a structure that is substantially identical to that of the claimed invention, therefore the claimed properties or functions are presumed to be inherent. The burden is on the applicant to show that the Johanessen device does not possess and is not capable of these functional characteristics. See MPEP 2112.01.

Claims 7, 24: the at least one incident light waveguide (210) comprises one incident light waveguide (see figure 5, waveguide 210 is one waveguide);

the output light waveguides (206, 208) comprise two or more output light waveguides (see figure 5);

a branching ratio between quantities of light branched into the two or more respective output light waveguides is substantially equal (column 7, lines 37-39).

Claim 8: wherein the at least one incident waveguide comprises a single mode optical waveguide (column 2, lines 51-53).

Claim 9: wherein at least one of the core and clad of the multi-mode waveguide is composed of a polymer (column 6, lines 47-56).

Claim 11: the device of figure 5 is an optical device.

Claims 29, and 31: wherein said at least one optical waveguide (210) is directly optically connected to said multi-mode waveguide (see figure 5).

Claims 33 and 35: wherein said light entering said multi-mode waveguide from said at least one optical waveguide has said wavelength (as the light that's being branches enters from the input waveguide (210) it necessarily has the wavelength of light).

Claims 37 and 39: each distinct wavelength that is split by the device can be considered to be a single wavelength.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 2, 3, 5, 6, 12-18, 25, 28, 30, 32, 34, 36, 38, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johannessen in view of Ido (US Patent 6,236,784, hereinafter Ido).

With respect to claims 2 and 25, Johannessen teaches: A light branching optical waveguide (200) comprising:

At least on incident light waveguide (A, a) (210) optically connected to one end of a multi-mode optical waveguide (214); and

Output light waveguides (B) (206, 208) connected to the other end of the multi mode waveguide (214);

An intensity distribution of light entering from at least one optical waveguide (a, A, only one input, waveguide 212 is disregarded) (210) into the multi-mode optical waveguide at a connected surface of the at least one incident light waveguide (210) and the multi-mode optical waveguide is asymmetric (due to the curve of waveguide (210)) with respect to a geometrical central axis of the at least on optical waveguide (210), the at least one optical waveguide (210) having a curved structure (see figure 5) with light entering from said at least one optical waveguide (a, A, 210) into said multi-mode optical waveguide (214), and with light having a wavelength entering at least two of said output light waveguide (206, 208) from said multi-mode optical waveguide, so as to branch said light from the multi-mode optical waveguide having the same wavelength into each of said at least two of said output light waveguides (*column 7, lines 19-44 teaches the output powers can be made to be the same, which would split light having the same wavelength into each of the outputs, and also that the Y-branch can be formed using the Y-branches 10 and 40, which are described as being made of a material with desired properties*

for a desired communications wavelength 1310 nm and 1550nm, suggesting one of those wavelengths be used through the device, and as the power can be split equally between the outputs, each output would get the same wavelength, either 1310 or 1550nm).

Johannessen is silent to a core shape of the multi-mode optical waveguide is asymmetric with respect to a geometrical central axis of the multi-mode waveguide.

Ido teaches an asymmetrically shaped MMI whose shape can change the intensity distribution of the light passing through the Y branch optical waveguide (see specification and figures 1, 2, and 5-15).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an asymmetric multi mode section, as taught by Ido, as the multi-mode optical waveguide section (214) of the Johannessen device, because the asymmetrical shape allows for the control of output light intensity distribution of the two output branches (Abstract, column 1, lines 10-33) with increased efficiency (via lower unwanted radiation losses, column 3, lines 55-57) and would increase the versatility of the device. One of ordinary skill in the art would have a reasonable expectation of success and would be further motivated to combine the teachings of the asymmetric structure of Ido, with the device of Johannessen as both disclosures are directed to the output intensity ratio of optical waveguide couplers and combining both teachings would allow the greatest control of the specific branching and intensity ratios.

With respect to claim 3, Johannessen further teaches an extended line of the geometrical central axis of the at least one optical waveguide (210) does not coincide with a geometrical central axis of the multi-mode optical waveguide (figure 5).

With respect to claim 5, Ido teaches:

Wherein the core shape of the multi-mode optical waveguide has a notch at at least one of its side edges (see figure 1).

With respect to claim 6, Ido teaches:

A light branching optical waveguide according to claim 5, wherein: the notch is obtained by cutting out a core of the multi-mode optical waveguide from a side to be connected to the at least one incident light waveguide (I) to a side edge of the core (see figure 1);

and a shape of the notch has a sinusoidal curve ranging from the side to be connected to the at least one incident light waveguide (I) to a side to be connected to the output light waveguides (III) (column 11, lines 51-60, and figure 1).

With respect to claim 12, the patentability of an apparatus depends only on the claimed structural limitations. The Johanessen and Ido combination teaches a structure that is substantially identical to that of the claimed invention, therefore the claimed properties or functions are presumed to be inherent. The burden is on the applicant to show that the combination device does not possess and is not capable of these functional characteristics. See MPEP 2112.01.

With respect to claim 13, Ido teaches:

wherein the core shape of the multi-mode optical waveguide has a notch at at least one of its side edges (see figure 2).

With respect to claim 14, Ido teaches:

wherein the notch is obtained by cutting out a core of the multi-mode optical waveguide (II) from a side to be connected to the at least one incident light waveguide (I) to a side edge of the core (see figure 2);

and a shape of the notch has a sinusoidal curve ranging from the side to be connected to the at least one incident light waveguide (I) to a side to be connected to the output light waveguides (III) (column 11, lines 51-60, and figures 1 and 2).

With respect to claims 15 and 28, Johannessen teaches:

the at least one incident light waveguide (210) comprises one incident light waveguide (see figure 5, waveguide 210 is one waveguide);

the output light waveguides (206, 208) comprise two or more output light waveguides (see figure 5);

a branching ratio between quantities of light branched into the two or more respective output light waveguides is substantially equal (column 7, lines 37-39).

With respect to claim 16, Johannessen teaches:

wherein the at least one incident waveguide comprises a single mode optical waveguide (column 2, lines 51-53).

With respect to claim 17: Johannessen teaches:

wherein at least one of the core and clad of the multi-mode waveguide is composed of a polymer (column 6, lines 47-56).

With respect to claim 18, the device of claim 2 is an optical device (see figure 5 of Johannessen).

With respect to claim 30 and 32: wherein said at least one optical waveguide (210) is directly optically connected to said multi-mode waveguide (see figure 5).

With respect to claim 34 and 36: wherein said light entering said multi-mode waveguide from said at least one optical waveguide has said wavelength (as the light that's being branches enters from the input waveguide (210) it necessarily has the wavelength of light).

With respect to claim 38 and 40: each distinct wavelength that is split by the device can be considered to be a single wavelength.

12. Claims 10, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johannessen.

With respect to claim 10, Johannessen teaches the limitation of claim 9 as previously presented. Johannessen is silent to the polymer comprises a polyimide-based resin containing fluorine. The Examiner takes official notice that polyimide-based resins are well known materials for optical waveguides, and fluorine is a well known dopant for waveguides that is used for adjusting the index of refraction of the waveguide. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use a polyimide based resin containing fluorine as the material of the waveguide, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

With respect to claims 19 and 20, Johannessen teaches the limitations of claim 1 as previously stated. The device of Johannessen would inherently have an offset between the extended line of the geometrical central axis of the input waveguide and multi mode waveguide but Johannessen does not specifically state the offset between the extended line of the geometrical central axis of the input waveguide and multi mode waveguide as 1.5 microns or .7 microns or less. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to offset the waveguides a specific amount to yield a desired branching ratio or optimum optical loss, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN M. BEDTELYON whose telephone number is (571)270-1290. The examiner can normally be reached on Monday - Friday, 10:00am - 6:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Uyen-Chau Le can be reached on 571-272-2397. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JMB/
Examiner, Art Unit 2874

/Kevin S Wood/
Primary Examiner, Art Unit 2874